Washington State

Guide to Preparing Your Vehicle Maintenance Plan

For Washington State Passenger Transportation Services Providers in Meeting State Maintenance Requirements Associated With Grant Funded Vehicles

Washington State Department of Transportation

August 2007

Guide to Preparing Your Vehicle Maintenance Plan

For Washington State Passenger Transportation Services Providers in Meeting State Maintenance Requirements Associated With Grant Funded Vehicles

Prepared by the
Washington State Department of Transportation
Public Transportation Division

In partnership with:
A task force made up of representatives from the Community Transportation Association (CTA-NW) and Tribal Transportation providers.

Washington Grantee Task Force Members included: Mike Bailey, COAST; Fred Eckenberg, Cowlitz Tribe; David R. McCoy, Paratransit Services; Kelly Scalf, Rural Resources; Jeff Solomon, People for People; and Tom Young, Northwest Connections/Transpro

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Contents

All organizations receiving Washington State Department of Transportation (WSDOT) grants for vehicles must develop a vehicle maintenance plan and program. This guide describes WSDOT's maintenance requirements for grant funded vehicles, provides detailed instructions in developing the required vehicle maintenance plan, and describes other activities that WSDOT considers to be best practices for vehicle maintenance and management. Also included in this guide are a plan template and sample forms that can be modified based on the types of vehicles you operate.

The requirements described in this guide are consistent with Federal Transit Administration (FTA) requirements. The plan requirements are based on those developed for the Transit Asset Management Plans in accordance with Washington State Law.

Background on the Requirement

This section provides background information on vehicle maintenance requirements and asset management best practices for organizations awarded federal or state grants through WSDOT for passenger transportation vehicles.

What is Required?

As a condition of receiving capital grant funds for the purchase of vehicles, organizations are required to submit a vehicle maintenance plan to WSDOT. The plan must provide for the maintenance and preservation of grant funded vehicles where WSDOT retains legal ownership. At a minimum the preservation activities must meet the manufacturer's recommendations.

Who Must Have a Plan?

The plan requirement apply to all organizations awarded federal or state grants through WSDOT, except transit agencies, for transportation program vehicles in which WSDOT maintains legal ownership. This includes all current and future grant recipients as well as Medicaid Brokers who act as lead agencies through the capital grant process.

Which Assets Are Covered by the Plan?

The plan must cover all vehicles purchased by your organization using grant funds for which WSDOT retains legal ownership. However, as a best practice, grant recipients are encouraged to adopt these practices for all of their assets.

Why is a Plan Required?

FTA requires state agencies that administer grant funds on their behalf to ensure grant funded assets are properly maintained. Additionally, Senate Bill 5248 passed by the 2003 Washington State Legislature mandated specific asset management requirements for transit agencies. Although the state law applies only to transit agencies, WSDOT has adopted many of the same standards for all organizations receiving grant funded vehicles.

How Were the Specific Requirements Developed?

WSDOT's Public Transportation Division (PTD) invited representatives from the Community Transportation Association of the Northwest (CTA-NW) and other grant funded organizations to participate on a task force. The volunteers on the Washington Grantee Task Force represented non-profit organizations from both urban and rural areas of the state and a representative from a tribal transportation provider. Members of the Washington Grantee Task Force included:

Urban Representative

Tom Young, Northwest Connections

Rural Representatives

Larry Anderson, HopeSource
Mike Bailey, Council on Aging and Human Resources
David R. McCoy, Paratransit Services of Clallam County
Kelly Scalf, Rural Resources
Jeff Solomon, People for People

Tribal Representative

Fred Eckenberg, Cowlitz Tribe

What Was the Role of the Washington Grantee Task Force?

The Washington Grantee Task Force provided guidance to WSDOT by:

- Establishing the requirements for grant recipients.
- Recommending Best Practices for vehicle maintenance.
- Refining the framework for the vehicle maintenance plan requirements.
- Ensuring the requirements can be accomplished by all sizes and types of grant recipients.
- Identifying and developing appropriate tools for implementing the plan/program.

> ***Note:*** *Practices identified in this guide that are considered to be Best Practice are formatted in italics. Those activities are not required but are recommended to help you further extend the useful life of your vehicles and save money.*

What Are the Best Practices?

While the minimum requirements apply only to grant funded vehicles, WSDOT considers the maintenance and management activities described in this guide as "best practice" for all of an organization's vehicles. These activities can benefit an organization by reducing operation costs and extending the useful life of the vehicles, while improving safety for employees and the riding public. The methods described are consistent with lowest life-cycle cost (LLCC) methodologies developed by transit industry professionals in Washington State.

What is Lowest Life Cycle Cost Methodology?

Best Practice *– Lowest life cycle cost methodology (LLCC) is considered to be a best practice. The term was defined by the transit maintenance expert panel, during the development of the transit asset management plan, and was based on how the concept was applied by other industries. LLCC is defined below:*

> *"Lowest life cycle cost methodology is demonstrated by a cost model that reflects each agency's policies and standards in a planned preventative/preservation maintenance program resulting in the lowest maintenance costs over the life of an asset. This methodology ensures that an asset is maintained at an acceptable condition maximizing safety and useful life."*

This means incremental preventative maintenance activities are conducted to preserve the life of the vehicle. In addition to preserving the vehicle's life, this approach results in lower maintenance costs over the life of the vehicle. When using LLCC methodology, transportation providers assess the cost of a vehicle over its projected useful life and take the preventative maintenance measures needed to avoid more costly repairs.

When Are the Plans Due?

Current grant recipients must submit their plan prior to September 30, 2007. Organizations new to the consolidated grant program during the 2007-2009 or subsequent funding cycles must submit their plans prior to the reimbursement for their first grant funded vehicle.

What Will be Required in the Future?

Grant funded organizations will need to submit a copy of their plan prior to the beginning of each biennium and/or each time the plan is updated. Grant recipients will also need to certify on an annual basis that they are still following their vehicle maintenance plan. The certification must be submitted with their Annual Passenger Service Vehicle Inventory report.

Where Do I Submit My Plan?

All Vehicle Maintenance Plans, along with a certification letter signed by the organization's authorized representative, should be submitted to:

WSDOT Public Transportation Division
Safety and Asset Management Specialist
310 Maple Park
PO Box 47387
Olympia, WA 98504-7387

Plan Requirements and Best Practices

This section provides guidance on what the plans must contain and best practices for you to conisder including in your plan.

What Does the Plan Framework Consist of?

The plan framework consists of the following specific elements:

1. A Mission Statement incorporating the organization's commitment to vehicle maintenance.
2. An inventory of the assets covered by the plan using the forms included on the disc accompanying this guide.
   a. The organization sets its own replacement schedule. However, WSDOT established a minimum useful life for vehicles.
   b. ***Best Practice*** *– Each agency, based on local conditions, should determine the maximum useful life of their vehicles.*
3. Preventative Maintenance Program including the following elements:
   a. A graduated preventative maintenance (PM) program (i.e., A-B-C; or 1-2-3; etc.) based on manufacturer's recommendations.
   b. ***Best Practice*** *– Grant recipients are encouraged to adapt their program to address local conditions.*
   c. A description of the organization's practices and policies that form the basis of their graduated PM program.
   d. ***Best Practice*** *– Provide a general description of local conditions that effect PM service intervals of the organization. Local driving conditions include, but are not limited to:*

      i. Travel Speed
      ii. Ridership
      iii. Topography
      iv. Weather
      v. Local Policies
      vi. Type of Service

      The PM schedules can be modified over time as experience and technology warrant or change.

> ***Note:*** The information in section 3.c above is a required component if your organization is going outside of the manufacturer's recommendations.

   d. Sample inspection sheets for each level of the PM intervals on a vehicle type that is representative of the organization's fleet.

4. A system to identify, track, and report maintenance, repair, and preservation activities.
    a. A record keeping system that tracks the above for each vehicle separately. (This can either be a computer-based system or a manual system depending on the organization's capabilities.)
    b. ***Best Practice*** *– If your organization wants to analyze the life cycle costs associated with your vehicles, the PM and repair costs applicable to each vehicle must also be tracked.*
5. A process to authorize, direct, and control maintenance activities and costs. This includes an established business practice to manage maintenance activities.
6. If the organization's vehicles are maintained by a service contractor or subcontractor, include a description of the method used to ensure that the maintenance is performed and completed in accordance with the organization's standards. At a minimum, this must include an annual review of:
    a. Documentation of work performed by subcontractors.
    b. Physical inspection of the vehicles maintained by subcontractors.
    c. Copies of comparable inspections completed by other regulatory agencies may be used in lieu of the above inspections.

    Best Practice *– You may want to consider more frequent inspections of your vehicles and the maintenance records.*
7. ***Best Practice*** *– A system of warranty recovery.*
8. ***Best Practice*** *– A cost model reflecting the organization's policies and standards (see LLCC methodology statement). The cost model reflects the organization's policies and standards resulting in the lowest maintenance costs over the life of a vehicle. The methodology ensures a vehicle is maintained at an acceptable condition, maximizing safety and useful life.*

This section provides guidance on the specific information that must be included under each section of the plan and best practices that may also be included. The Washington Grantee Task Force developed a template to assist organizations in preparing their plan. The plan template is located in Appendix A of this guide.

What Does a Mission Statement Consist of?

A mission statement sets guiding principals for vehicle maintenance including a responsible Preventative Maintenance (PM) program. In addition, it should imply how maintenance ties in to the services you provide. The mission statement will vary from organization to organization. Below is a sample:

> "The mission of ABC Transportation's vehicle maintenance program is to provide safe, clean, reliable, and comfortable vehicles for use by our customers and drivers."

How Do I Prepare the Inventory?

The Vehicle Maintenance Plan must include an inventory of all of the vehicles covered by the organization's plan. The inventory should be submitted on the form provided. This is the same form used for the annual inventory report associated with your grant. At a minimum, you must include all grant funded vehicles.

Best Practice *– The plan should cover all passenger service vehicles owned by the organization.*

There has been a great deal of confusion regarding how to complete the inventory form. Please use the information below to ensure the form is completed properly.

Include the following information for each passenger service vehicle covered by the plan:

1. Year/Make/Model.
    a. Year – The year the vehicle was manufactured.
    b. Make – The name of the chassis and body manufacturers (i.e., Ford Eldorado, etc.).
    c. Model – The model name or number assigned by the manufacturer (caravan, E-350, etc.).
2. Vehicle Code – The type of vehicle (refer to the rolling stock vehicle codes on the list located in Appendix C of this guide).
3. Vehicle Identification Number (VIN) – The serial number assigned by the chassis manufacturer.

4. Agency Vehicle Number – The number assigned to the vehicle by your organization.
5. Condition – The point rating that best describes the mechanical/service condition of the vehicle:
   a. 100 – Only routine preventative maintenance needed.
   b. 80 to 90 – Good working order, requiring only infrequent minor repairs (more that six months between repairs).
   c. 50 to 70 – Requires frequent minor repairs or infrequent major repairs.
   d. 20 to 40 – Requires frequent major repairs (less than six months between repairs).
   e. 10 – Continued use presents excessive repair costs and potential service interruption.

> ***Note:*** WSDOT has not defined what constitutes a major repair versus a minor repair. For the purposes of the inventory, use your agency's policy on determining minor versus major repairs.

6. Age – The age of the vehicle in years.
7. Remaining Useful Life – The estimated number of years the vehicle will be able to carry out its intended purpose before being replaced. WSDOT's "Vehicle Disposition Schedule" identifies minimum service life for grant funded vehicles. However, each organization may have its own replacement schedule that is longer than WSDOT's.
8. Replacement Cost – The current year estimated purchase price for a new vehicle of this type.
9. Seating Capacity – The number of seats available to the public both ambulatory and wheelchair stations (includes driver for vanpool vehicles).
10. Fuel Type – The letter abbreviation of the type of fuel used by the vehicle. (See inventory forms for a list of fuel types.)
11. WSDOT Title – If the vehicle was purchased with grant funds through WSDOT, is the title still held by WSDOT?

What Strategies Should be Described?

As discussed in the Introduction to this guide, there are specific asset management strategies that should be included in your organization's plan. Below is a description of those strategies.

A Graduated Preventative Maintenance (PM) Program

A graduated PM program consists of established service intervals with progressively more detailed activities (i.e., A-B-C; or 1-2-3; etc.) based on manufacturer's recommendations. Each vehicle type should have its own PM schedule and inspection sheets.

The following information should be included in the plan:

1. A statement of practices and policies that form the basis of the organization's graduated PM program.
2. ***Best Practice*** *– You may want to consider adapting your PM program based on your local conditions. If so, include a general description of local conditions that effect the PM service intervals such as:*
   a. Travel Speed
   b. Ridership
   c. Topography
   d. Weather
   e. Local Policies

> ***Note:*** Section 2 above is required if your organization's PM service intervals differ from those recommended by the manufacturer.

3. A copy of the applicable inspection sheets for a vehicle that is representative of your grant funded fleet/vehicle(s). Use the manufacturer's recommendations as a guideline.

   Best Practice – PM schedules are modified as experience and technology warrant/change.

> ***Note:*** It is common for public transportation vehicles to have more than one owner's manual. When establishing your plan and program, be sure that all applicable manufacturers' recommendations are incorporated.

A System to Identify, Track, and Report Maintenance, Repair, and Preservation Activities

Each agency should maintain record keeping system that identifies, tracks, and reports the maintenance, repairs, and preservation activities applicable to each vehicle. This means that the activities associated with each vehicle in their fleet are tracked separately. This may be accomplished by using a fleet management system. However, it may be easier for small agencies with very few vehicles to use a spreadsheet or other tracking method.

In your plan, provide a description of the method used by your organization. Whatever method your organization uses, you need to keep track of the following information for each vehicle:

1. Maintenance and repairs.
   a. Work order or some other system that describes:
      i. When was the work done (date, mileage, service hours, etc.).
      ii. What work was done.
2. Preservation activities (preventative maintenance).
   a. Work order or some other system that describes:

i. When was the work done (date, mileage, service hours, or other similar metered information).

ii. What work was done.

iii. When the work is due again.

3. *Best Practice – Include a system to track the maintenance and repair costs. (The cost of parts and materials used for pm and repair activities for each vehicle.)*

   a. *Labor costs including benefits and overhead – your financial officer should be able to provide assistance with this.*

   b. *Cost of fuels and other fluids.*

   c. *The cost of outside services, if any.*

   d. *Warranty recovery – repair costs recovered from the manufacture.*

> ***Note:*** If you decide to analyze your life cycle costs you will need the ability to track the maintenance costs described in step 3 above.

A Process to Authorize, Direct, and Control Maintenance Activities and Costs

Provide a description of your organization's business practices related to managing maintenance activities. Your organization should assign a person or position that is responsible for overseeing maintenance activities and costs. The person responsible must ensure that the PM program is carried out in accordance with your plan and make certain other necessary repairs are completed.

A Process to Oversee Work Done by Contractors

If your organization's vehicles are maintained under contract by a service contractor, the plan should include a method to ensure preventative maintenance and repairs are performed and completed in accordance with your organization's standards. This includes:

1. A periodic review of the documentation of work performed by the contractor(s).
2. A periodic physical inspection of the vehicles maintained by the contractor(s). The physical inspection should be completed on at least an annual basis.

Describe the process used by the organization to review the maintenance practices of your contractors and inspect the applicable vehicles. Copies of the check lists used during these reviews should also be attached to your plan.

A System of Warranty Recovery

Best Practice *– Your organization should have a process to track warranty repairs. The process should ensure that a person or contractor certified by the applicable manufacturer completes the repairs. If the repairs are made by*

a maintenance contractor or dealer, they will usually bill the manufacturer directly. However, if your organization's employees make the repairs you must obtain approval from the manufacturer(s). Describe the method used by the organization.

A Cost Model That Reflects Your Organization's Policies and Standards

***Best Practice** – Include a statement in the plan explaining how your organization uses the cost model or a similar life cycle cost analysis tool. To assist organizations with the cost analysis component, the Transit Maintenance Expert Panel developed a cost model tool. The tool will assist you in identifying the life-cycle costs and will automatically chart the information you input. The cost model was developed for maintenance professionals to easily analyze the life cycle costs of their maintenance practices and potential changes to their practices. The tool is made up of three elements.*

1. *Current Practices Cost Sheet – A worksheet reflecting the life cycle costs associated with your current PM program.*
2. *Alternate Practices Cost Sheet – A worksheet reflecting the projected life cycle costs associated with the proposed change.*
3. *Life Cycle Cost Analysis Chart – A chart that compares the life cycle cost differences for both of the above. This chart automatically generates based on the information input on the current practices and alternate practices cost sheets.*

The cost model may also be used to analyze the differences of life cycle costs of different fleets within your agency and to identify problem vehicles potentially needing replacement ahead of schedule.

While the basic components of the cost model are the same for all organizations, the costs and specific intervals identified will be unique to your system.

How Do I Use the Cost Model?

The cost model tool is designed to be "plug and play." Your organization will only need to fill in the information related to costs and frequencies. The tool will automatically generate a graph based on the information you provide. Below are detailed instructions on how to use the cost model:

1. *Current Practices Cost Sheet – Select the worksheet titled "CP Cost Sheet," enter the following information:*
    a. *Vehicle Description – In column "b," enter the following base information for the vehicle used for the cost model:*
        (1) ***Vehicle Type** – The size and type of vehicle used for the cost model (i.e., 15 passenger minibus bus).*
        (2) ***Useful Life** – Number of years your organization intends to operate the vehicle (WSDOT useful life definition is a minimum).*
        (3) ***First Cost** – The purchase price of the vehicle.*

(4) ***Inflation Rate*** *– The percentage rate of inflation used by your organization to project future costs.*

(5) ***PM & Inspection*** *– The average amount it costs your agency for PM and inspection.*

(6) ***Engine R\|R*** *– The cost for your organization to remove and replace an engine.*

(7) ***Trans R\|R*** *– The cost for your organization to remove and replace a transmission.*

(8) ***Brake Program*** *– The average cost per vehicle for your organization's brake program.*

(9) **Tire Program** *– The average cost per vehicle of your organization's tire program.*

(10) ***Miles\|Year*** *– The average number of miles per vehicle accumulated each year.*

(11) ***Miles\|PM*** *– The mileage interval between each PM and inspection.*

(12) ***Engine Miles*** *– The number of miles you expect the engine to last.*

(13) ***Trans Miles*** *– The number of miles you expect the transmission to last.*

(14) ***Brake Miles*** *– The mileage intervals used for your brake program.*

(15) ***Tire Miles*** *– The number of miles you expect the tires to last.*

(16) ***Road Calls\|Per Call*** *– The average cost your organization incurs for a road call.*

b. *Calculating Life Cycle Costs – Based on the information you provided under vehicle and PM description, enter the following in the unshaded columns under the appropriate heading:*

(1) ***PM & Inspection*** *– On each line, enter the average number of PM & inspection cycles perform on the vehicle each year.*

(2) ***Engine R\|R*** *– Enter an "x" on the line corresponding to the year(s) the engine is expected to be replaced.*

(3) ***Trans R\|R*** *– Enter an "x" on the line corresponding to the year(s) the transmission is expected to be replaced.*

(4) ***Brake Program*** *– Enter an "x" on the line corresponding to each year you expect to complete your brake program*

(5) ***Tire Program*** *– Enter an "x" on the line corresponding to each year the tires are expected to be replaced.*

(6) ***Road Calls*** *– For each year, enter the average number of road calls per vehicle.*

2. *Alternate Maintenance Practices – Select the worksheet titled "AP Cost Sheet." Repeat the steps identified above changing the information to reflect the proposed changes to your PM program. (Example: If you intend to change from petroleum based oils to synthetic lubricants, the cost of the PM & inspection may go up. However, the number PM and inspection cycles performed each year may be reduced).*
3. *Chart – Select the worksheet named "chart." Based on the information you provided in steps 1 and 2, the chart will self generate.*

Where Can I Get Help?

In addition to this guide, Public Transportation Division staff members and members of the Maintenance Task Force are available to provide training and technical assistance to organizations. Please contact the Safety and Asset Management Specialist at (360) 705-7926 to request assistance.

Appendix A Sample Plan Template

The following pages include a sample plan to meet the planning parameters associated with the Vehicle Maintenance Plan requirements.

You can find an electronic version of the sample plan on the CD located in the front of this guide or you may download this file at:
www.wsdot.wa.gov/transit/library

Sample Plan

XYZ Transportation
Vehicle Maintenance Plan

Mission Statement

The Maintenance Department's mission is to effectively and efficiently provide safe, clean, reliable, and comfortable vehicles for use by its customers and operators.

Graduated Preventative Maintenance (PM) Program

The emphasis of XYZ Transportation maintenance program is preventive rather than reactive maintenance. A strong preventive maintenance program effectively reduces overall maintenance costs by decreasing the number of road calls and the high cost of unpredictable repairs caused by reactive maintenance. XYZ Transportation uses a graduated preventative maintenance program (PM) that is based on the manufacturer's recommendations and modified based on our experience and the local conditions we deal with in XYZ County. Solid PM practices maximize useful life, are cost efficient over the life of the vehicle, and ensures that our vehicles remain in safe operating condition.

XYZ Transportation has an aggressive preventive maintenance program that schedules bus inspections based on a variety of categories. A PM schedule is developed for each type or group of vehicles we operate. The PM schedule established is based upon usage and vehicle type. The schedule is progressive. Each successive PM includes a higher level of maintenance inspection activity. Vehicles are inspected based on mileage and time. In addition, each vehicle receives an annual comprehensive inspection.

XYZ Transportation staff continually review our maintenance practices to identify potential improvements to the program. This assures optimum benefits from the scheduled inspections. Engine oil analysis is an integral part of the inspection program. Oil analysis occurs differently for different fleet types. Some are based on mileage or hours operated. The purpose is for early identification of unusual engine wear thereby, acting to prevent catastrophic engine failures.

On-time inspection variance

The allowable variance with all preventive maintenance inspections is a minus 500 miles to a plus 500 miles. Any inspection completed within this parameter is considered on time.

Each sub-fleet has its own specific PM schedule. Samples inspection sheets used for a 15 Passenger Eldorado Minibus are attached.

Local Conditions

Best Practice *- local conditions have a direct impact on the level of pm needed. Xyz transportation provides service throughout abc county. The following conditions are considered when developing a pm program for a vehicle or group of vehicles:*

- *Service design*
  - *Urban service – fixed route and complimentary paratransit service. Due to the frequency of the stops and traffic congestion in the urban area, vehicles used for this service require a higher level of pm*
  - *Rural area – route deviated service. Infrequent stops in a long distance corridor*
- *Topography – abc county is located along the pacific coast. The terrain is fairly flat. However, sand and salt may cause premature wear on certain parts of the vehicles. Those parts are inspected more frequently than the manufacturer recommends.*
- *Weather – abc county rarely experiences inclement weather. However, the average rainfall is approximately 156 inches per year.*
- *Local policies*
  - *The xyz transportation board requires that all vehicles be equipped with cloth seats for the passengers. This type of seat is more difficult to clean and therefore is more costly to maintain.*
  - *Cleanliness – all vehicles must be cleaned daily*
  - *Graffiti – all graffiti must be removed within 24 hours*

Authorize, Direct, and Control Maintenance Activities and Costs

The Maintenance Manager is responsible for developing the PM schedule for each type of vehicle we operate and for ensuring all PM activities are completed in a timely manner and are consistent with the manufacturer's recommendations.

Throughout the PM and repair process the tasks performed by maintenance staff are under constant review by the Maintenance Department management and staff. This constant review is designed to ensure that review and decisions are made at the proper level of management.

Each day the Maintenance Manager prints and reviews the PM Tracking report to identify which vehicles are due or will be due for Preventative/Preservation Maintenance. The identified vehicles are removed from service and scheduled for work.

The work is then assigned to a Preventative Maintenance Technician who performs the PM and completes the appropriate PM inspection form. The technician is provided with complete instructions on how to perform the

PM and is required to follow those instructions through completion. Very minor repairs (i.e. light bulbs and the securing of fasteners etc.) are done during the PM process.

XYZ Transportation maintains separate PM inspection process for specific component systems such as wheelchair lifts, HVAC systems, and fare collection systems. These component systems each have their own PM schedules, forms, and tracking reports. A maintenance supervisor is charged with the task to review the tracking reports and generate the work orders to perform the tasks.

Other needed repairs may be identified during the PM inspection. These are referred to as "PM write ups". In addition, drivers may report vehicle problems. The Supervisor and/or the Lead person review the PM write-ups and driver reports. The repairs are then scheduled into the repair shop, assigned to a mechanic, and completed before the bus returns to service. A separate work order is issued for this type of repair.

System to Identify, Track, and Record Maintenance Activities and Costs

XYZ Transportation uses a system of manual and computerized forms and reports to schedule and perform PM and repairs to its fleet of vehicles. These documents include:

- Work orders
- Service orders
- Purchase orders
- Parts requests
- PM Tracking report
- PM Inspection forms (these vary based on type of vehicle and level of PM to be performed)

After the Maintenance Manager identifies which vehicles are due for PM, a work order is prepared describing the work to be done, the account codes to be charged, and instructions as to which level of PM is to be performed. All the PM labor and costs are captured under the PM code on the work order. When there is a PM write-up, a new work order or multiple work orders are then generated listing those repairs. All repair labor and parts are charged to the work orders under the specific coding applicable to the individual repairs.

The required parts and supplies are assembled by the inventory department and charged to the work order. The PM work order is checked and completed by the inventory department. The inventory department then updates the PM Tracking Report to show when the PM was completed.

If a repair is determined be covered under the warranty, the appropriate coding will be identified on the work order.

Best Practice *- any warranty parts removed from the vehicle(s) are tagged with the repair information and sent to the inventory department for storage until requested by the manufacturer/vendor. The maintenance staff member responsible for the parts inventory submits a warranty claim to the applicable manufacturer/vendor. That staff member also tracks warranty claims via the open warranty tracking report. (see warranty recovery program section of this plan for more details).*

Process to oversee work done by contractors

XYZ Transportation contracts with a private operator for its dial a ride service. This includes maintenance of vehicles owned by XYZ Transportation. The contractor is required to maintain the vehicles in accordance with our plan. To ensure compliance XYZ Transportation requires the contractor to submit all work orders for preventative maintenance and repairs to our Maintenance Manager. In addition, Maintenance Department staff conducts an annual physical inspection of all XYZ Transportation vehicles maintained by the contractor.

Warranty Recovery System

Best Practice *- xyz transportation operates a warranty recovery program to ensure that cost of parts and repairs on warranty-covered items are recovered.*

Failed Components

Best Practice *- parts and components that may have failed prematurely are reported to the maintenance staff member responsible for our parts inventory. That staff member researches the original installation date, miles of usage on the failed component, and the vendor it was originally purchased from. If the part or component is covered by a warranty, it is returned to the vendor.*

Return to manufacturer/vendor

Best Practice *- authorization for warranty return and labor claims, if applicable, are obtained from the manufacturer or vendor. Information is supplied to the vendor on the circumstances of the failure, if known. The item is then returned to the vendor's warranty department for repair or replacement. Xyz transportation retains copy of the warranty claim form for tracking purposes.*

Receipt from manufacturer/vendor

Best Practice *- when a unit is received at xyz transportation, it is entered into the inventory system via an inventory adjustment form that is coded as a warranty replacement. A journal voucher form is completed and forwarded to our accounting department to make the necessary*

accounting adjustments. The credit for labor, if received, is applied to the appropriate cost center via a credit entry applied to the work order used when the defective part was removed.

Cost Analysis Tool

***Best Practice** - xyz transportation's maintenance department uses a life cycle cost analysis tool as part of its decision-making process when establishing and making changes to preventative maintenance intervals. This enables our agency to analyze the cost implications of alternative practices over the life of the vehicle(s).*

Appendix B Sample Cost Model

Best Practice – The following pages contain a sample of the cost model described earlier in this guide. The cost model is mean to provide maintenance professionals with an easy to use tool to:

- *project the life cycle costs of the preventative maintenance program,*
- *analyze the life cycle cost implications of changes to the program,*
- *identify potential efficiencies, and*
- *compare life cycle costs of different vehicle types.*

You can find an electronic version of the cost analysis tool on the CD located in the front of this guide or you may download this file at:
www.wsdot.wa.govltransitllibrary

Sample Cost Sheets

Amounts shown are for example only.

Current Practices Cost Sheet

Asset Type	22' Cutaway
Useful Life	8 years
First Cost	$ 54,880
Inflate Rate *1	3%
PM & Insp.	$ 160.00
Engine R/R	$ 6,000
Trans R/R	$ 4,000
Brake program	$ 1,560
Tire program	$ 1,000
Miles/Year	20,000
Miles/PM	5,000
Engine Miles	250,000
Trans Miles	100,000
Brake Miles	30,000
Tire Miles	30,000
Road Calls/per call	$ 300
Multipliers based on inflation	
Year 1	1.00
Year 2	1.03
Year 3	1.0609
Year 4	1.0927
Year 5	1.1255
Year 6	1.1593
Year 7	1.1941
Year 8	1.2299
Year 9	1.2668
Year 10	1.3048
Year 11	1.3439
Year 12	1.3842

EXAMPLE
LIFE CYCLE COST ANALYSIS TOOL
Current Maintenance Practices
BASED ON 22 foot Cutaway Minibus

ASSET LIFE	PM & Inspection		Engine RR		Trans. RR		Brake program		Tire program		Road Calls		Projected Total Ownership
	# per year	Cost	Year (x)	Cost	Year (x)	Cost	Year (x)	Cost	Year (x)	Cost	# per year	Cost	
Year 1	4	$ 640		$ –		$ –		$ –		$ –	2	$ 600	$ 1,240
Year 2	4	$ 659		$ –		$ –	x	$ 1,607	x	$ 1,030	1	$ 309	$ 3,605
Year 3	4	$ 679		$ –		$ –	x	$ 1,655	x	$ 1,061	1	$ 318	$ 3,713
Year 4	4	$ 699		$ –		$ –		$ –		$ –	1	$ 328	$ 1,027
Year 5	4	$ 720		$ –	x	$ 4,502	x	$ 1,756	x	$ 1,126	1	$ 338	$ 8,441
Year 6	4	$ 742		$ –		$ –	x	$ 1,808	x	$ 1,159	2	$ 696	$ 4,405
Year 7	4	$ 764		$ –		$ –		$ –		$ –	3	$ 1,075	$ 1,839
Year 8	4	$ 787		$ –		$ –	x	$ 1,919	x	$ 1,230	4	$ 1,476	$ 5,411
Year 9		$ –		$ –		$ –		$ –		$ –		$ –	$ –
Year 10		$ –		$ –		$ –		$ –		$ –		$ –	$ –
Year 11		$ –		$ –		$ –		$ –		$ –		$ –	$ –
Year 12		$ –		$ –		$ –		$ –		$ –		$ –	$ –
TOTALS		**$ 5,691**		**$ –**		**$ 4,502**		**$ 8,745**		**$ 5,606**		**$ 5,139**	**$ 29,682**

*1 The rate used as the inflation factor is agency specific, consult your finance officer for the applicable rate in your area

Alternate Practices Cost Sheet

Asset Type	22' Cutaway
Useful Life	8 years
First Cost	$ 54,800
Inflate Rate *1	3%
PM & Insp.	$ 230.00
Engine RR	$ 6,000
Trans RR	$ 4,000
Brake Program	$ 1,560
Tire Program	$ 1,000
Miles/Year	20,000
Miles/PM	15,000
Engine Miles	130,000
Trans Miles	75,000
Brake Miles	30,000
Tire Miles	20,000
Road Calls/per call	$ 300
Multipliers based on inflation	
Year 1	1.00
Year 2	1.03
Year 3	1.0609
Year 4	1.0927
Year 5	1.1255
Year 6	1.1593
Year 7	1.1941
Year 8	1.2299
Year 9	1.2668
Year 10	1.3048
Year 11	1.3439
Year 12	1.3842

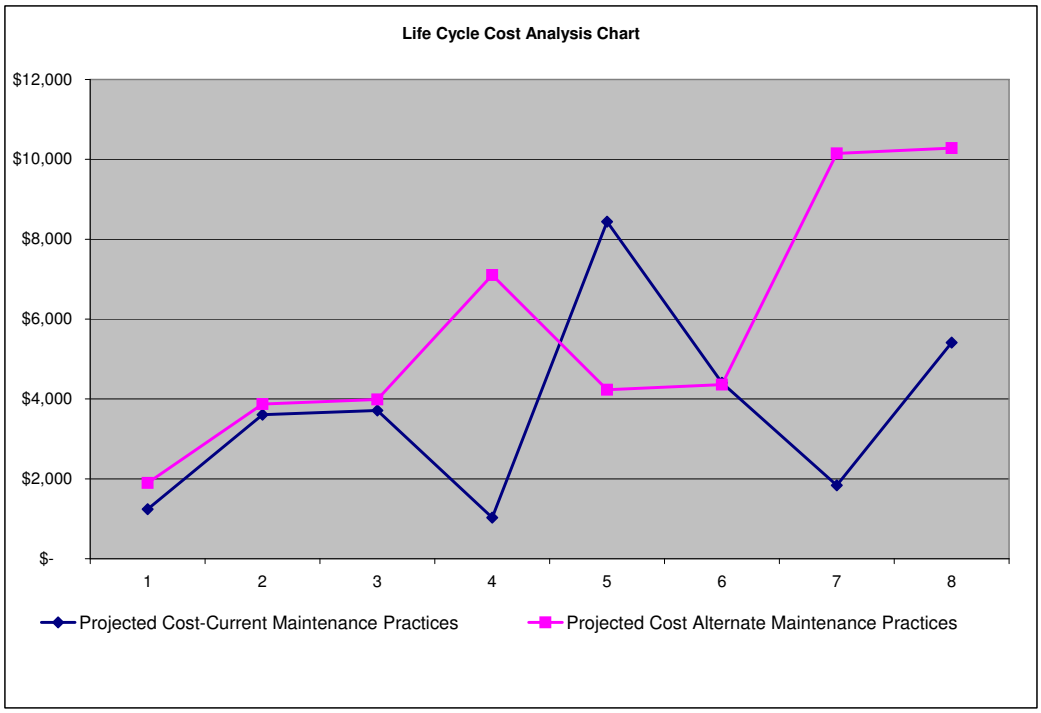
EXAMPLE
LIFE CYCLE COST ANALYSIS TOOL
Alternate Mainteance Practices
BASED ON A 22 FOOT CUTAWAY MINIBUS

ASSET LIFE	PM & Inspection		Engine RR		Trans. RR		Brake program		Tire program		Road Calls		Projected Total Ownership
	# per year	Cost	Year (x)	Cost	Year (x)	Cost	Year (x)	Cost	Year (x)	Cost	# per year	Cost	
Year 1	1.3	$ 299		$ –		$ –		$ –	x	$ 1,000	2	$ 600	$ 1,899
Year 2	1.3	$ 308		$ –		$ –	x	$ 1,607	x	$ 1,030	3	$ 927	$ 3,872
Year 3	1.3	$ 317		$ –		$ –	x	$ 1,655	x	$ 1,061	3	$ 955	$ 3,988
Year 4	1.3	$ 327		$ –	x	$ 4,371		$ –	x	$ 1,093	4	$ 1,311	$ 7,102
Year 5	1.3	$ 337		$ –		$ –	x	$ 1,756	x	$ 1,126	3	$ 1,013	$ 4,231
Year 6	1.3	$ 347		$ –		$ –	x	$ 1,808	x	$ 1,159	3	$ 1,043	$ 4,358
Year 7	1.3	$ 357	x	$ 7,164		$ –		$ –	x	$ 1,194	4	$ 1,433	$ 10,148
Year 8	1.3	$ 368		$ –	x	$ 4,919	x	$ 1,919	x	$ 1,230	5	$ 1,845	$ 10,281
Year 9		$ –		$ –		$ –		$ –		$ –		$ –	$ –
Year 10		$ –		$ –		$ –		$ –		$ –		$ –	$ –
Year 11		$ –		$ –		$ –		$ –		$ –		$ –	$ –
Year 12		$ –		$ –		$ –		$ –		$ –		$ –	$ –
TOTALS		**$ 2,659**		**$ 7,164**		**$ 9,290**		**$ 8,745**		**$ 8,892**		**$ 9,127**	**$ 45,878**

*1 Inclusion of and inflation rate is optional in calculating costs

Sample Life Cycle Cost Analysis Chart

This chart is self-generated by the Cost Analysis Tool based on the information provided on current practices and alternate practices cost sheets.



This section contains the forms needed to complete the vehicle inventory required as an attachment to your plan. Instructions for completing the form can be found on pages 7-8 of this guide.

Use the information below to determine the appropriate vehicle code for each vehicle listed on the inventory.

You can find an electronic version of the inventory form on the CD located in the front of this guide or you may download this file at:
www.wsdot.wa.govltransitllibrary

> ***Note:*** On the inventory form, list only the vehicles covered by this plan. At a minimum, this includes all grant funded vehicles for which WSDOT retains legal ownership.

Best Practice – WSDOT encourages grantees to adopt these practices for all of their passenger service vehicles.

Rolling Stock Vehicle Codes			
01	Bus - 40 ft.	15	Rail Cars - LRT
02	Bus - 35 ft.	16	Rail Cars - Rapid
03	Bus - 30 ft.	17	Rail Cars - Commuter Self-Propelled
04	Bus - <30 ft.	18	Rail Cars - Commuter Trailer
05	Bus - Articulated	19	Rail Cars - Trolley
06	Bus - Intercity	20	Rail Cars - Intercity
07	Bus - Trolley	21	Locomotive
08	Bus - Trolley Articulated	22	Cable Car
09	Bus - Double Deck	23	People Mover
10	Bus - Dual Propulsion	24	Car - Incline Railway
11	Cutaway (under 30 ft.)	25	Fixed Guideway Cars (e.g., Monorail)
12	Body-on-Chasis (under 30 ft.)	26	Ferry Boats
13	Van - Vanpool	27	Streetcar Replicas
14	Van - Special Service	28	Other

Public Transportation Management System
Owned Rolling Stock Inventory & Verification of Continued Use

I hereby certify that all information reported in the inventories reflects true, accurate and complete information for the agency/organization listed and that project equipment purchased through a state or federal grant agreement is still being used in accordance with the terms and conditions of the grant

Signature and Title *Date*

Agency/Organization: _____

Date: _____

	Year/Make/Model	Vehicle Code	Vehicle Identification Number (VIN)	Agency Vehicle Number	Current Odometer	Condition (points)	Age (years)	Remaining Useful Life (years)	Replace-ment Cost $	ADA Access (yes/no)	Seating Capacity	Fuel Type	WSDOT Title (yes/no)
1.													
2.													
3.													
4.													
5.													
6.													
7.													
8.													
9.													
10.													
11.													
12.													
13.													
14.													
15.													
16.													

This section provides sample inspection forms that can be modified to address the preventative maintenance requirements of your vehicle(s). The following sample checklists can be found in this section:

- PM Inspection for Cutaways and Vans
- PM Inspection for Wheelchair Lift
- Semi-Annual Inspection Sheet
- Pre-Trip Inspection Sheet
- Contractor Review Checklists:
  - for Agencies With Maintenance Staff
  - for Agencies Without Maintenance Staff

You can find an electronic version of the forms on the CD located in the front of this guide or you may download this file at:
www.wsdot.wa.gov/transit/library

> ***Note:*** When making changes to the PM inspection forms you should consult the owners manuals received for each vehicle. A single vehicle may have three or more owner's manuals including, but not limited to:
> - Engine & Chassis (i.e. Ford, Dodge, Chevrolet, etc)
> - Air Conditioning/HVAC
> - Wheelchair Lift

Sample Cutaway Inspection Sheets

UNIT#	MAKE & MODEL		MILEAGE	HOURS	
Service Level A Complete Every 5,000 Miles					
OK	**SYSTEM**	**REPAIRS NEEDED**	**OK**	**SYSTEM**	**REPAIRS NEEDED**
	CAB			**SUSPENSION**	
	Heater/defroster			Front ball joints/king pins	
	Mirrors			Tie rod ends/drag links	
	Gauges			**DRIVE TRAIN**	
	Lights inside & out			Transmission	
	ELECTRICAL			Yoke & stub shafts	
	Battery			Rear differential	
	Terminals & connections			Seals on above	
	Hold downs			Universal joints	
	Backup alarm			Driveshaft support brgs	
	BRAKES & CLUTCH				
	Fluid level			**ENGINE**	
	Hoses			Check air cleaner	
	Linings visual check			Check for oil & water leaks	
	Parking brake			Check drive belts	
				Check oil cooler & lines	
				Check for fuel leaks	
	COOLING SYSTEM			**TIRES**	
	Antifreeze			Condition	
	Radiator hoses			Pressure	
	Heater hoses			Tread Depth in 32nds	
	Radiator core condition			FL FR RL RR	
	Coolant level				
	Radiator cap			**WINDSHIELD**	
	EXHAUST SYSTEM			Wipers & fluid	
	Exhaust pipe			Safety windows and hatch	
	Muffler			opened and closed all	
	Tail pipe				
	SHOCKS			**WHEELCHAIR LIFT**	
	Front				
	Rear			**OTHER**	
COMMENTS					
Date		Evaluated by			

Sample Cutaway Inspection Sheets *(continued)*

UNIT#	MAKE & MODEL	MILEAGE	HOURS
	LEVEL "B"----EVERY 15,000 MILES		
	ALSO PERFORM LEVEL "A"		
	Replace fuel filter		
	Fully Inspect brake system, removing a wheel		
	LEVEL "C"----EVERY 30,000 MILES		
	ALSO PERFORM LEVELS " A" AND "B"		
	Change Automatic Transmission Fluid		
	Lube & adjust 4x2 wheel bearings, grease seals		
	Inspect and lube 4x2 ball joints		
	Inspect and lube steering linkage		
	Replace air filter if needed		
	Replace cabin air filter if needed		
	Inspect exhaust system and heat shields		
	LEVEL "D"----EVERY 45,000 MILES		
	ALSO PERFORM LEVELS "A" AND "B"		
	Change green engine coolant		
	Take Oil Samples		
	LEVEL "E"---EVERY 90,000 MILES		
	ALSO PERFORM LEVELS "A", "B", "C", AND "D"		
	Inspect Drive Belts		
	LEVEL "F"----EVERY 150,000 MILES		
	ALSO PERFORM LEVELS "A", "B", AND "C"		
	Replace Spark Plugs		
	Replace Accessory Drive Belts		
	ANNUAL WHEELCHAIR PM MAINTENANCE		
	ANNUAL AIR CONDITIONING PM MAINTENANCE		
	ANNUAL OIL SAMPLES AFTER FIRST 45,000 MILES		

COMMENTS	
Date :	Evaluated By:

Sample Wheelchair Lift Preventative Maintenance Inspection Sheet

Sample Wheelchair Lift Preventative Maintenance Inspection Sheet

Date:_____ Vehicle #:_____ Mileage:_____ Interval:_____ Inspector:_____

TYPE OF OPERATIONS TO BE PERFORMED: '/' if Okay; 'X' if Adjusted; 'O' if Repairs are Required

PM WORK ORDER NUMBER:_____ REPAIR WORK ORDER NUMBER:_____

Connect remote control unit (if applicable) and cycle lift. Remove pans to aid inspection

TEST SAFETY FEATURES	**INSPECT HYDRAULIC HOS/ELEC CALBE BUNDLE**
Pressure sensitive mats	**Proper routing**
Pressure sensitive edges	**Leaks (hoses)**
INSPECT OUTER BARRIER/LINK/CYLENDAR	**INSPECT STOW MOTOR/STOW SHAFT**
Structural integrity of barrier	**Sprocket alignment**
Barrier angle	**Set screws in sprockets and bearings**
Pivot points for damage or wear	**Hydraulic hoses/fittings for leaks**
Linkage set screw/jam nuts	**Lube stow shaft bearings**
Cylinder attachment bolds	**Sprockets for damage or wear**
Hydraulic hoses/fittings for leaks	
Lubrication w/Anti-Seize	**INSPECT STOW/DEPLOY LIMIT SWITCH**
--Slide Link	**Stow switch activates ½" before full stow**
--Rod guide	**Deploy switch activates ½" before full deploy**
--Linkage pins	**Loose limit switch arm**
INSPECT INNER BARRIER/LINKAGE/CYLENDAR:	**INSPECT CHAIN LIMIT SWITCH (SLACK CHAIN)**
Structural integrity of barrier	**Adjust between limit switch arm and trip**
Barrier angle	**Loose limit switch arm**
Pivot points for damage or wear	**Note 1)Forward lift cylinder must operate freely up and down which allow the chain switch to operate properly**
Linkage set screw/jam nuts	**2)Lift cylinder chain must be flexible which allows the chain to switch to operate properly**
Cylinder clevis pin keepers	
Hydraulic hoses/fittings for leaks	
Rem. Cyl. Clevis pins; inspect & lube	
INSPECT MASTER CHAINS & LINKS FOR:	**INSPECT PROXIMITY SWITCHES**
Rust & corrosion	**Damage to the sensing end**
Absence of cotter pins/keepers	**Gap @ sensing end .0 0"-.060"**
Proper adjustment	
Lubrication	**INSPECT HYDRAULIC POWER SOURCE**
	Fluid Level
INSPECT SLAVE CHAINS & LINKS FOR:	**Hydraulic pressure (1250+/- 25#)**
Rust & corrosion	**Change filter element**
Absence of cotter pins/keepers	
Proper adjustment	**INSPECT LIFT MOUNTINGS**
Lubrication	**Inspect bolts and hardware for securement**
Jam nuts secured	
	CHECK FOR PLATFORM WAVE AT ARMS
INSPECT STOW/DEPLOY CHAINS & LINK	**INSPECT CRUTCH BEARING**
Rust & corrosion	**Proper adjustment**
Absence of cotter pins/keepers	**Galling (transference of material)**
Proper adjustment	**Lubrication**
Lubrication	
Jam nuts secured	**INSPECT TORQUE SHAFT SET SCREWS**
INSPECT STOW MOTER CHAIN & LINK	**INSPECT SLIDE CHANNEL BRG BLOCKS**
Rust & corrosion	
Absence of cotter pins & keepers	
Proper adjustment	
Lubrication	
MANUAL OPERATION OF HYDRAULIC SYSTEM	**INSPECT MAIN LIFT CYLINDER FWD & REAR**
Stow	**Cylinder clevis pins must be free of rust and corrosion**

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Sample Wheelchair Lift Preventative Maintenance Inspection Sheet *(continued)*

	Deploy		**and must move freely**
	Raise		**Remove, inspect, & lube cylinder clevis pins**
	Lower		**Inspect cylinder clevis pin keepers**
	Roadside barrier up		**Jam nut must be tight against cylinder rod**
	Roadside barrier down		**1" min threads in turnbuckle bolts**
	Curbside barrier up		**Speed of lift in cushion area**
	Curbside barrier down		**Lube cushion adjust screw cavities**
	INSP. FOR MANUAL OPERATING PROC. DECAL		**INSPECT STOW LATCH/CYLINDER**
			Proper stow latch engagement
	INSPECT PUCH OFF SPRINGS		**Hydraulic hose/fittings for leaks**
			Lubrication on stow latch face
	INSPECT ALL FASTENERS FOR TORQUE		
			INSPECT HANDRAILS FOR:
			Structural integrity
			Bolts secured
			Cracks in tubing
Install all pans and shields and cycle lift to verify proper operation before completing inspection			

DEFECTS IDENTIFIED DURING INSPECTION

MECHANIC'S SIGNATURE **SUPERVISOR's SIGNATURE**

DATE INSPECTION COMPLETED: **DATE REPAIR ORDER POSTED:**

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Sample Semi-Annual Inspection Sheet

SEMI-ANNUAL INSPECTION

Vehicle #_____Performed By:_____Date:_____
Mileage:_____Work Order #:_____

✓=Inspected R=Repair Made A=Adjusted N/A=Non-Applicable

SPRING:

_____ Air Conditioning Unit
_____ Batteries/Alternator
_____ Wash Radiator
_____ Starter Draw Test
_____ W/C Lift Inspection/Load Test
_____ Pressure Wash Radiator (Thomas Only)

FALL:

_____ Coolant PH & Freeze Point
_____ Chains
_____ Wiper Blade Replacement
_____ W/C Lift Inspection/Load Test
_____ Window Treatment (Aqua-Pel)
_____ Tire Condition/Winter Replacement
_____ Starter Draw Test
_____ Pressure Wash Radiator (Thomas Only)
_____ Headlight Adjustment

Sample Pre-Trip Inspection Form

Pre-Trip Inspection Report

Vehicle # _____ Operator _____ Date _____

	Ok	Defect
• Fluid Leaks Under Bus		
• Interior Lights		
• Passenger Seat Condition		
• Stop Chime		
• Emergency Equipment		
1) First Aid Kit		
2) Fire Extinguisher		
3) Reflections		
4) Strap Cutter		
• Passenger Door Operations		
• Windshield Wipers/Washers & Fluid		
• Fans/Defrosters		
• Horn		
• Driver Seat & Belt		
• Mirrors		

	Ok	Defect
• Radio/Cell Phone		
• Brakes		
• Parking Brake		
• Windshield		
• Destination Sign		
• Headlights, Signals, 4-Ways		
• Tire/Wheel Condition		
• Lug Nut Tightness		
• Body Condition		
• Cycle W/C Lift		
• W/C Tiedowns & Accessories		
• Schedules		
• Customer Service Forms		
• Farebox		

Mechanical Defect Report

Defect # (see above) _____

Remarks: _____

Maintenance Disposition

Work Order # _____

Repairs Made _____

Date Completed _____ Repaired By: _____

Driver Reviewing Inspection: _____ Date: _____

Sample Contractor Review Checklist for Agencies With Maintenance Staff

Sample Contractor Review Checklist For Agencies with maintenance staff CUTAWAYS

Vehicle #_____Performed By:_____ Date:_____
Mileage_____Work Order#_____

✓= INSPECTED R= REPAIRS REQUIRED A= ADJUSTMENT NEEDED N/A = NON APPLICABLE

CHECK ALL ITEMS SERVICED

OPERATING CONTROLS

_____ **Ignition Switch**
_____ **Neutral Start**
_____ **Warning Lights and Indicator Lamps**
_____ **Gauges & Lighting**
_____ **Parking Brake**
_____ **Door Controls**
_____ **Brake Interlock**
_____ **Exit Door Interlock**
_____ **Defrost & Heaters**
_____ **Fans**
_____ **Horn**
_____ **Drivers Controls & Switches**
_____ **Drivers Seat & Restraint**
_____ **Stop Request**
_____ **Radio**
_____ **Steering Wheel Adjustment**
_____ **Destination Sign, if applicable**

INTERIOR INSPECTION

_____ **Interior Lights**
_____ **Stanchions, Grab Handles and Rails**
_____ **Emergency Windows & Exits**
_____ **Roof Hatches**
_____ **Door Alignment**
_____ **Mirrors**
_____ **Decals**
_____ **Glass & Windshield**
_____ **Emergency Equipment:**
_____ **Fire Extinguisher, First Aid Kit, Body Fluid Kit, Strap Cutter, Triangles**

BATTERIES

_____ **Terminals & Cables**
_____ **Fluid Level**
_____ **Hold Downs**

EXTERIOR INSPECTION

_____ **Wiper Arms & Blades, Washer Fluid Level**
_____ **Mirrors**
_____ **Reflectors**
_____ **Body Panels**
_____ **Bumpers**
_____ **Moldings**
_____ **Bike Rack**
_____ **Curb Feelers**

TIRES AND WHEELS

_____ **Pressure**
_____ **Tread Condition RF_____LF_____**
(minimum 5/32 front)
RRI_____ RRO _____
LRO_____ LRI_____
(minimum 3/32 rear)
_____ **Sidewall Condition**
_____ **Lug Nuts**
Rims

WHEELCHAIR LIFT

_____ **Lift Operation**
_____ **Warning Light and Alarm or Override**
_____ **W/C Restraints**
_____ **Clean Tie-down Pocket**
_____ **Lift Extension Belt (Ricon Lifts Only)**

EXHAUST SYSTEM

_____ **Hangers**
_____ **Mufflers**
Pipes

ENGINE COMPARTMENT

_____ **Power Steering Fluid**
_____ **Coolant Level**
_____ **Brake Fluid**
_____ **Hoses & Clamps**
_____ **Check Belt Tension**
_____ **Starter Cables**
_____ **Radiator & Fan Shroud**
_____ **Fan**

Sample Contractor Review Checklist for Agencies With Maintenance Staff *(continued)*

UNDERCARRIAGE

_____ **Steering Box and Joints**
_____ **Tie Rod Ends and Drag Links (replace if 1/8" movement)**
_____ **Ball Joints**
_____ **Shock Absorbers**
_____ **Suspension: Air Suspension, Radius & Torque Rods, Air Bags**
_____ **Brake Lines**
Brake Lining Thickness
Ft. _____ _____ R _____ _____
_____ **Wheel Seals**
_____ **Wheel Bearings**
_____ **Fluid Leaks**
_____ **Air Leaks**
_____ **Fuel Tank: Condition, Mounting, Lines & Vents**
_____ **Axles, Differential Oil & Vent**
_____ **Underbody: Mud Flaps, Spray Guards**
_____ **Frame Cracks, Loose Crossmembers**

ROAD TEST

_____ **Acceleration**
_____ **Engine Performance**
_____ **Transmission Performance**
_____ **Steering Performance**
_____ **Braking Performance (Use VC3000 @ 20MPH) Record G_____**
_____ **Must be 0.5000 or higher to pass brake test**

DOCUMENTATION

For each vehicle maintained by the service contractor

What are the required maintenance intervals for the vehicle(s)?

Level A _____
Level B _____
Level C _____
Level D _____

Comments

_____
_____
_____
_____
_____

Do the contractor's records reflect that they are performing PM in a timely manner?

_____

Sample Contractor Review Checklist for Agencies Without Maintenance Staff

Contractor Review Checklist
For Agencies without Maintenance Staff

CUTAWAYS

Vehicle #_____Performed By:_____ Date:_____
Mileage_____

✓= INSPECTED R= REPAIRS REQUIRED A= ADJUSTMENT NEEDED N/A = NON APPLICABLE

PHYSICAL INSPECTION

Under the hood

_____ **Belts, frayed**
_____ **Hoses, cracked**
Engine block, clean of oil, coolant etc.
_____ **Hood light operative**
Check all fluid levels oil, coolant, power
_____ **steering fluid.**

Interior Check

All interior lights working, including dimmer
_____ **switch**
_____ **Check all wheelchair tiedowns for cleanliness,**
_____ **proper # and order of tiedowns**
_____ **or upholstery**
_____ **Seat condition, clean, no cuts or stains in vinyl**
_____ **Check seats that raise for wheelchair stations**
for smoothness of operation
_____ **First Aid Kit - full, strap cutter, Body Fluid**
_____ **Cleanup - full, triangles neatly folded and**
_____ **secured with proper number needed**
_____ **Fire Extinguisher secure and tag not expired,**
_____ **Dash lights all operative, check all switches for**
operation, wiper blades in good condition
washer fluid full, horn, backup alarm in
reverse

Wheelchair lift operation

_____ **Lift clean**
_____ **Check override on lift belt, is light operating?**
_____ **Smoothness of operation on lift outboard barrier**
Check override that lift will not work without
vehicle being in Park with Emergency Brake
_____ **on and W/C switch activated at driver seat**

Exterior Walk-around

_____ **Fluid leaks under coach**
_____ **Suspension, coach sagging any direction, up check**
_____ **front end bounce up and down to check shocks on**
_____ **smaller coaches. Should go down and only 1 x.**
Visual on leaf springs-nothing hanging that
_____ **shouldn't be**
_____ **Obvious cleanliness of coach**
_____ **All exterior lamps working, clearance, license plate**
light, tail,turn and 4-ways
Unreported body damage/scratches

DOCUMENTATION

For each vehicle maintained by the service contractor

What are the required maintenance intervals for the vehicle(s)?

Level A _____
Level B _____
Level C _____
Level D _____

Do the contractor's records reflect that they are performing PM in a timely manner?

_____

Comments

_____
_____
_____
_____
_____